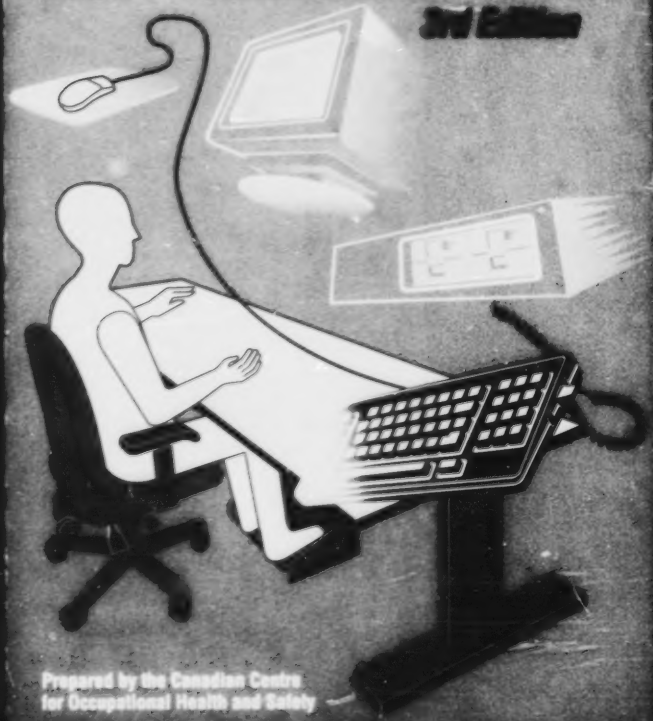
Office Ergonomics

3rd Edition



Prepared by the Canadian Centre for Occupational Health and Safety

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Fire

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Police

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Poison Control Centre

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Doctor

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Company Emergency Phone Number

Prepared by

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Canadian Centre for Occupational Health and Safety
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Office Ergonomics Safety Guide

3rd Edition

CCOHS

Canadian Centre for Occupational Health and Safety

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Office Ergonomics Safety Guide

Objectives

This guide will enable you to:

- develop an understanding of the basic elements of office ergonomics;
- identify tasks that can potentially cause repetitive motion injury (RMI) and other injuries to the muscles and joints;
- develop an ergonomics program and set goals for your workplace; and
- focus on problem solving through employee and management involvement.

Scope

This guide is applicable to office work and covers factors that contribute to compatibility between workers and office work. It covers ergonomic aspects of the workstation, work organization, the work environment and recommended safe work practices.

This guide will assist in the development and implementation of office ergonomics programs. For employee training sessions, it is a practical handout for participants.

Target Audience

This guide is for managers, supervisors, workers, people working from their homes, occupational health nurses, occupational therapists, chiropractors, health and safety representatives and health and safety professionals.

Summary

Ergonomics deals with the compatibility between workers and their work. "Work" is made up of the work environment, workstations, and tasks. Poor ergonomic conditions exist when the "work" is incompatible with the workers' bodies and their ability to continue working. Such conditions may cause discomfort, fatigue and, consequently, injury.

Injuries resulting from poor ergonomic conditions are collectively known as musculoskeletal injuries (MSI), repetitive strain injuries (RSI) or repetitive motion injuries (RMI). The causes of these injuries are prolonged work involving repetitive movements, forceful movements and awkward body postures. RMIs are painful and often disabling injuries which affect mainly the wrists, back, legs, shoulders, neck, muscles and joints.

Adequate environmental conditions are important for the overall well-being of workers and productivity. When the work area is too cold or too hot, poorly lit, noisy, poorly ventilated, or contains unpleasant odours it results in annoyance, stress, fatigue, eye strain, headache and other conditions.

Injuries and illnesses related to poor ergonomic conditions can be prevented by making the workplace and the work organization fit the physical and mental needs of each individual worker.

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Introduction

Repetitive Motion Injuries (RMI) are the most commonly occurring hazards in modern offices. These injuries result from poorly designed workstations, and inadequate job design.

Two common types of RMI are muscular strain in the neck, shoulders and back, due to prolonged sitting; and injury to joints and muscles due to excessive repetition of movements. Injuries due to repetitive movement are known as repetitive strain injury (RSI), repetitive motion injury (RMI), musculoskeletal injuries (MSI) and work related musculoskeletal disorders (WMSD). In this guide we will use RMI.

The following table summarizes common ergonomic and safety hazards in office work.

Ergonomic and Safety Hazards in Office Work

Hazard Type	Causes	Prevention
Ergonomic Hazards		
Eye strain/ headaches	• poor lighting • glare/flicker on screen • awkward posture	• adequate lighting • proper workstation design • equipment maintenance
Repetitive Motion Injury (RMI)	• repetitive tasks • poor posture/incorrect seating • poorly designed workstations • Incorrectly sited VDTs, work equipment	• proper work station • adequate job design • comfortable work environment
Back ache/strain	• improper manual material handling techniques • awkward posture	• training in proper lifting procedures • proper chairs and workstations • scheduled breaks
Safety Hazards		
Trips, slips, falls sprains, strains, fractures	• cluttered floors • slippery patches • trailing cables • improperly stored materials • open cabinets, drawers and doors	• good housekeeping • proper workplace layout • safe work practices
Cuts and abrasions	• poorly designed office equipment • sharp edges on furniture/equipment	• properly designed tools and equipment
Burns/electric shock	• faulty wiring, poorly wired electrical equipment • electric heaters • static electricity build up	• electrical safety training • routine safety checks • safe handling procedures • grounding

Section I

Ergonomic Hazards in the Office Workplace

1. What is Ergonomics?
2. What is RMI?
3. Why is there so much Commotion about Ergonomics?
4. What are the Common Symptoms of RMI?
5. How do Repetitive Motion Injuries (RMI) occur?
6. How does RMI Affect our Body?
7. What to do if you Notice Symptoms of RMI
8. How are RMI Treated?

1. What is Ergonomics?

The word ERGONOMICS is made up of two Greek words: "ERGOS" (WORK) + "NOMOS" (NATURAL LAWS)

In simple words, we can define ergonomics as the science of matching the work (job) to the worker.

Office ergonomics includes workstation design, job design and work environment.

A workstation that does not match the worker's shape, size and capabilities may hinder the task performance. A poorly designed workstation may pose undue physical stress on the worker due to awkward posture, application of force, repetitive movements, or a combination of these factors. Prolonged work in such conditions can result in injuries of the wrists, back, neck, shoulders and elbows in particular; and muscles, joints and nerves in general.

The economic consequences of poor ergonomic conditions include poor work quality and productivity, and increased cost from WCB, lost time and disability

2. What is RMI?

Repetitive motion injuries (RMI) are injuries that involve muscles, and tissues connecting bones, namely tendons and ligaments. Two types of RMI affect office workers:

1. Sore muscles due to prolonged stationary positions resulting in
   - ✎ neck ache
   - ✎ back ache
2. Repetitive Motion Injuries (RMI) due to a combination of awkward posture, repetitive motion, and application of force in an awkward posture
   - ✎ pain in the wrists and hands
   - ✎ shoulder pain

Repetitive motion injuries (RMI) are also called Overuse Syndrome, Over-Exertion Injury, Repetitive Strain Injury (RSI), Musculoskeletal Injury (MSI), and Work Related Musculoskeletal Disorder (WMSD). These different names are used to emphasize the fact that these injuries result when a given part of the body is subject to strain while performing a task.

Depending on the nature of the job, the most frequently affected parts of the office worker's body are the torso, including the lower back, shoulders, neck, arms and wrists.

For reasons not fully understood, carpal tunnel syndrome (CTS) has become synonymous with all RMI suffered by office workers operating computers. In reality, carpal tunnel syndrome is considered a relatively rare medical condition.

3. Why Is There So Much Commotion about Ergonomics?

Office work presents RMI risks due to:

- fixed and constrained postures that are frequently awkward, and maintained for too long
- repetitive hand movements
- high pace of movements that does not allow sufficient time for recovery from the effects of these movements

Office ergonomic hazards are related to workstation design, job design, repetitive motion, posture, vision, thermal conditions, noise, safety and job design. Long periods (months to years) of work in poorly designed workplaces increase the risk of RMI.

In recent years, reported cases of wrist injuries and back disorders have been constantly increasing. Many of these injuries are serious and require prolonged medical treatment, and often surgery. In the workplace, such injuries have resulted in lost productivity and quality, as well as increased costs from lost days and disability compensation.

4. What are the Common Symptoms of RMI?

RMI primarily affects the hands, wrists, shoulders and arms.

The following are some of the warning signs:

- Pain: burning or aching
- Fatigue
- Tingling, numbness
- Loss of grip, clumsiness
- Stiffness: difficulty in closing or opening door knobs
- Reduced control or coordination of body movements
- Hypersensitivity: tenderness to the touch

Different types of RMI are known by many different names depending on the type of injury and affected body part. The following table summarizes symptoms of some common injury types.

Musculoskeletal Injuries

Type of Disorder	Symptoms
Back disorder	Pain in the back; difficulty in turning, bending and moving the back.
Carpal tunnel syndrome (CTS)	Compression of the median nerve as it enters the palm of the hand through "carpal tunnel". The symptoms are pain and numbness in the index and middle fingers and weakness of the abductor muscles of the thumb.
Tendonitis	Pain mainly in the hands and wrist due to inflammation of the tendon as a result of overuse. Tendons are fibre bundles that attach muscles to bones.
Tenosynovitis	Pain due to inflammation of the tendon sheath, producing pain and swelling. It may result from loss of lubricating system of the bone joints as a result of repetitive and excessive hand movement.
Thoracic Outlet Syndrome	Pain, arm weakness, and numbness in the arms and fingers as a result of the squeezing of the nerves and blood vessels between the neck and shoulders.
Bursitis	Restriction and pain in joint movement as a result of deficient lubrication at a bone joint, for example at the shoulder.

Pain

In the early stages of injury, discomfort is the main symptom. As conditions persist, the injury continuously worsens, leading to severe impairment and disability.

Pain is the most common symptom of RMI. The pain can range from mild discomfort to unbearable agony and may not be confined to the site of injury. It can spread upwards, sideways and downwards from the site of the injury.

Early Stage of pain: The body aches and one feels tired at work, but symptoms disappear during the time away from work. The injury does not interfere with the ability to work. The injury will heal completely if dealt with properly at this early stage.

Intermediate Stage of pain: The injured area aches and feels weak soon after start of work, until well after work has ended. The injury will still heal completely if dealt with properly.

Advanced Stage of pain: The injured area aches and feels weak even at rest. Sleep is affected. Even light duties are very difficult.

5. How do Repetitive Motion Injuries (RMI) Occur?

The following are the three main causes of RMIs:

Repetition: *Work activities performed with high rate of repetition*

Force: *Work activities which require application of excessive muscle force for a long time*

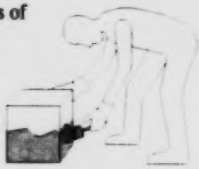
Posture: *Work activities which require maintaining fixed awkward postures for a long time.*

Repetitive movements are one of the leading risk factors for RMI, especially when such movements involve the same joints and muscle groups. There are no standardized rules to judge the degree of repetitiveness of a task. Keyboarding, mouse operation and data entry are examples of repetitive movements in office work.

Movements are forceful when substantial physical effort is required to perform a task. The amount of force we use depends on many factors, such as the weight of the objects to be lifted and their placement in relation to the body. We have to use more force to lift and carry a box if our arms are outstretched and the object is held away from the body. Also, we have to use more force to lift the same object in a "pinch" position than in a "hook" position.

Fixed or awkward body positions can cause discomfort and fatigue if they are maintained for long periods of time. Everyone is familiar with the discomfort associated with sitting rigidly for too many hours.

The following are some examples of awkward body positions:



- Working with the torso bent forward, backward or twisted.
- Reaching above shoulder level.
- Bending the wrist forward, backward, or side to side.
- Fixed position of the neck and the shoulders when performing controlled arm movement.

Keyboard work is a common type of office work requiring repetitive movement. Inadequate workstation design may require a fixed awkward body position or an awkward wrist position, thus contributing to all the above sources of RMI risk.

Duration of work is an important factor. Repetitive motion injuries develop slowly and are usually noticeable only after weeks, months, or years of work involving overuse of muscles, tendons, nerves and joints. Injury as the result of a single accident does not cause RMI. For example, slipping on a wet floor could cause a sprain but this injury would not be called an RMI.

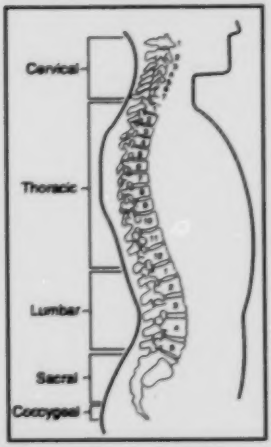
6. How does RMI Affect our Body?

We can group RMI in four categories:

- joint injury
- muscle injury
- tendon injury
- nerve injury

Joint Injury

A joint is the connecting point for two or more bones. Joints are of three types: (i) freely movable, (ii) slightly movable and (iii) immovable. The elbow, shoulder and spine are examples of joints. At the joint, the opposing surfaces of the bones are lined with flexible tissue called cartilage, made up of fibrous tissues and soft tissues. Cartilage provides a smooth surface for movements.



The spinal column–a series of many joints

The shoulder, elbow and wrist joints

As a result of repetitive forceful movements of joints, the cartilage softens, and some of its fibres separate. The normally smooth cartilage becomes pitted and frayed, and whole segments of cartilage may be lost. Bony outgrowths form, which interfere with the movement of joints. These changes interfere with the joint movement and can cause severe pain. These changes also mark degenerative joint disease or osteoarthritis.

Muscle Injury

Muscles provide the force to perform a task. For every movement, the muscles squeeze together, or contract, and then relax.

When we do prolonged work in a sitting position, our muscles are contracted for too long. When we use a keyboard or mouse our muscles are contracted with little chance to relax. This causes reduced flow of blood to the muscles. As a result, the chemical by-products (waste substances produced by the muscles) are not removed fast enough, and they build up. The accumulation of these substances causes muscle irritation, injury and pain.

If the muscle is allowed to rest and recuperate, repair of the muscle injury occurs and the pain disappears. However, if damage repetitively occurs every day for months and years, the muscle is not able to repair the damage as fast as it occurs. As a result, long-lasting or permanent injury will develop.

Tendon Injury

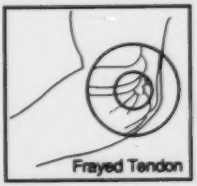
Tendons are fibre bundles that attach muscles to bones. Tendons are elastic and flexible; they assist in concentrating the pull of the muscle on a small area of the bone. Some tendons are surrounded by tendon sheaths which are tubular double layered sacs containing synovial (lubricating) fluid.

Tendon injuries occur as a result of repetitive or frequent work activities and awkward postures. These injuries affect mainly the hand and wrist and also the shoulder, elbow and forearm.

Tendonitis

When a tendon is repeatedly tensed, some of its fibres can be torn apart. The tendon becomes thickened and bumpy, causing inflammation, tenderness and pain. Tendonitis is the general term indicating inflammation of the tendon.

Tenosynovitis



The inner walls of the sheaths surrounding tendons contain cells that produce a slippery fluid which lubricates the tendon. With repetitive or excessive movement of the hand, the lubrication system may malfunction. It may not produce enough fluid, or it may produce a fluid with poor lubricating qualities. Failure of the lubricating system creates friction between the tendon and its sheath, causing inflammation and swelling. The inflammation of the tendon sheath is known as tenosynovitis.

Ganglion Cyst

An inflamed tendon sheath may swell up with lubricating fluid. This causes a bump under the skin called a ganglion cyst.

Bursitis

In some parts of the body, such as the shoulder, tendons pass through a narrow space between bones. A sac called a bursa, lies between the tendons and the bones. The bursa acts as an anti-friction device. Repeated stretching or squeezing of the bursa causes inflammation known as bursitis.

Nerve Injury

Nerves carry signals from the brain to control muscle activity. They also carry information about temperature, pain, and touch from the body to the brain and control bodily functions such as sweating and salivation.

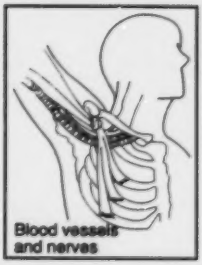
Nerves are surrounded by muscles, tendons, ligaments, and blood vessels. With repetitive motions and awkward postures, the tissues surrounding nerves become swollen, and squeeze or compress nerves.

Two common RMIs that affect the nerves are:

- Thoracic outlet syndrome
- Carpal tunnel syndrome

Thoracic Outlet Syndrome

Thoracic outlet syndrome is caused by squeezing of the nerves and blood vessels between the neck and shoulders.

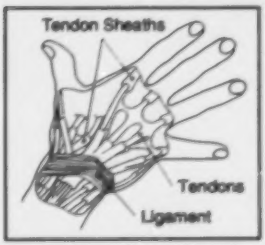


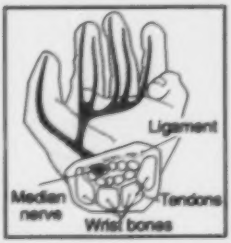
Work involving prolonged restricted posture such as carrying heavy shoulder loads, pulling shoulders back and down, or reaching above shoulder level can cause the swelling of tendons and muscles in the shoulders and upper arms. When swollen, they can squeeze the nerves and blood vessels between the neck and shoulders.

The symptoms of thoracic outlet syndrome include pain, arm weakness, and numbness in the arm and fingers. In some cases, the sense of touch or the ability to feel heat and cold may be lost.

Carpal Tunnel Syndrome

Carpal tunnel syndrome is a disorder of the wrist. The carpal tunnel is a channel through the wrist (carpal) bones. The carpal tunnel is a passageway for blood vessels, tendons, and the median nerve as they pass from the arm into the hand.





The median nerve controls the action of the hand, thumb, index and middle fingers. Also, the median nerve transmits sensations of hot, cold, pain and touch to and from the hand and fingers.

Causes

Carpal tunnel syndrome is caused by jobs involving repeated bending, twisting, pinching, grasping, strong gripping and the use of vibrating tools. Some common examples of such jobs are: typing and computer keyboard work, cashier, assembly work, carpentry, brick laying, sanding, butchery, and housekeeping.

Symptoms

The symptoms of carpal tunnel syndrome are:

- pain in the wrist
- numbness, tingling, burning sensations in the wrist and hands
- difficulty in movement of fingers and hand
- difficulty in gripping things
- pain in arm and shoulder

Prevention

- Position hand and wrist comfortably
- Use two hands instead of one hand
- Reduce repetition (e.g. vary tasks)
- Use ergonomically designed tools
- Maintain tools in good working condition to avoid need for excessive force
- Wear gloves and use tool handles with good grip
- Ask your doctor or therapist for hand exercises

Treatment

Prompt treatment can prevent further damage and relieve symptoms of carpal tunnel syndrome. Types of treatment include rest, use of pain killers, and splints for hand and wrist. In very serious cases, surgery may be required.

Back Injury

Back pain is a common condition among working adults. Some people get back pain off and on. The time between episodes of pain could be several days or months. There are also people who experience a dull ache in their back all the time.

Causes

Work-related causes of back pain are:

- Poor workplace design
- Poor body posture
- Lifting and handling heavy loads
- Forceful exertion, bending, twisting, etc.
- Working in a stooped position
- Prolonged sitting in a fixed position
- Psychological stress
- Inadequate rest periods (repetitive work)
- Poor fitness level

Work-related back pain develops gradually. For example, heavy lifting may result in cumulative damage to the spine over a period of time. The time at which the injury actually occurs may be just a matter of chance.

Symptoms

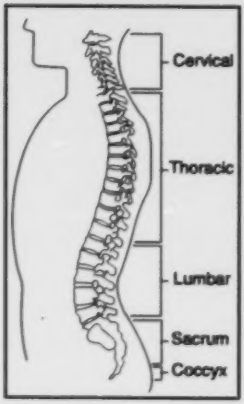
Common symptoms of back pain include the following:

- Feeling of "tight band" across the lower back.
- Pain while working in bent position.
- Pain and stiffness when getting up in the morning or when sitting or standing for long periods.
- Difficulty in straightening the back when standing.
- Sudden intense pain in the lower back causing difficulty in moving from one place to another.
- Back pain spreading to the thighs and lower leg with tingling and numbness in the foot and toes.

Prevention of Back Injury

Posture

- Use good body posture. Maintain your back's natural curves.



Lifting

- Lift by holding the load close to the body.
- Follow lifting guides. (See page 39)

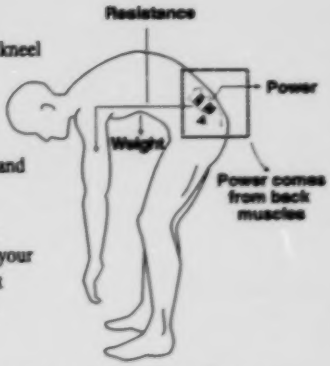
Reaching

- Don't overstretch yourself. Reach only as high as is comfortable for you.
- Use a stool or ladder if you need it.
- When reaching down, support your body with one arm.

Working in a standing position

- Place one foot on a low stool to balance your body.
- Keep your knees slightly bent, pelvis tilted forward.

Bending



- To bend safely, kneel down on one knee.
- Bend your hips and knees and not your back.
- When reaching forward, move your whole body, not just your arms.

Sitting

- Adjust chair height so that the thighs are horizontal and the feet rest comfortably on the floor.
- Maintain straight posture. Slouching puts pressure on the back.
- Adjust chair-desk combination to position the work at elbow height for writing and keying tasks.
- If the desk is too high when the chair is correctly adjusted, raise the chair and use a foot rest to correctly position the feet.

7. What to Do If You Notice Symptoms of RMI

People who notice symptoms of MSI or suspect that they may have an RMI should see a physician immediately. Diagnosis of repetitive motion injuries is confirmed by performing laboratory and electronic tests that determine the degree of nerve or muscle damage. Self-diagnosis and self-treatment of RMI is not advisable.

At the same time, report the condition to your manager/ employer and the Joint Health and Safety Committee. They will explore the feasibility of adjusting your workstation, equipment and work environment to help alleviate the problem.

8. How are RMI Treated?

Always seek medical advice before starting treatment for any medical condition including repetitive motion injuries. Treatment procedures may include the following:

- restriction of movement
- application of heat and cold
- physiotherapy
- medication and surgery

Restriction of Movement

The first approach is to reduce or avoid the activities causing the injury. This may require work restrictions and in some cases, transfer to a different job.

In some circumstances, a splint can also be used to restrict movements or to immobilize the injured joint. However, the use of splints requires extreme caution. If used inappropriately, splints can cause more damage than good. For example, a splint may transfer stress to another joint.

The long-term solution is job redesign to avoid the extreme load on the joints.

Application of Heat and Cold

Applying heat or cold seems to relieve pain temporarily and may accelerate the repair process. Ice reduces pain and swelling. Ice or cold packs can be applied on the injured area for ten to fifteen minutes every two or three hours for two days. Excessive use of ice may damage skin and nerves.

Heat is not recommended for injuries with significant inflammation and swelling. Heat increases the flow of blood and increases swelling.

Heat can be applied on the injured area after the swelling has subsided. At that point, heat can speed up healing, help relieve pain, relax muscles, and reduce joint stiffness.

Consult your doctor before applying heat or cold.

Exercise

Exercises restore strength and movement to an injured body part. Consult a physiotherapist or occupational therapist before exercising. Exercise programs can aggravate the existing condition if not properly designed.

Medication and Surgery

Medical treatments of RMI range from pain killers to surgery. However, it is important to remember that if you return to the same, unmodified job following treatment or surgery, the RMI will likely occur again and probably more severely.

Section II

Office Ergonomics Program

1. What is an Office Ergonomics Program?
2. How to Identify Ergonomic Hazards
3. How to Control Ergonomic Hazards
4. Ergonomic Aspects of Visual Display Terminals
5. Office Safety
6. Exercises to Do in the Office
7. Education and Training

1. What is an Office Ergonomics Program?

An office ergonomics program is a systematic approach and a management system to reduce risk from ergonomic hazards. The program must:

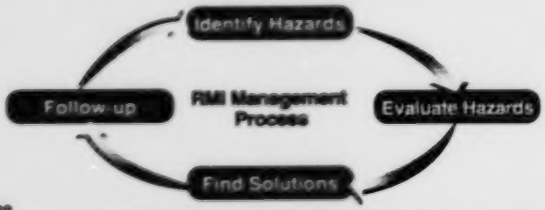
- have the support of senior management;
- carry the signature of the highest authority;
- clearly state its objectives and rationale;
- give the steps to be followed and their sequence;
- assign authority, responsibility and deadline for each step.

An office ergonomics program includes the following basic components:

- Hazard identification: worksite evaluation
- Implementation of solutions: improving workplace conditions and work practices
- Training and education of employees: empowering employees to work safely
- Evaluation of the effectiveness of solutions
- Continuous improvement of the program for better results

There is no universal ergonomics program that applies to all workplaces. A suitable program is one which is tailored to meet specific needs of a particular workplace by taking into account production requirements, staff capabilities and the risk of losses due to RMI.

Comment: Know who your department contact for ergonomic issues is. Notify your supervisor if you have ergonomic concerns.



2. How to Identify Ergonomic Hazards

The recognition of ergonomic hazards is important to their prevention. This involves identifying conditions and practices where improvements need to be made.

The hazard recognition process should be coordinated by a team. The members of the team should be representatives of management and workers, health and safety specialists, and engineers, if feasible.

Hazard recognition is an ongoing process. It includes the following steps:

1. Find existing or potential RMI problems at their earliest stages. A good strategy entails, among other things, the use of health surveys and checklists.
2. Ask people specific questions about their health as it relates to their work. (See Appendix A1 for a sample Ergonomics Survey Questionnaire).
3. Repeat a health survey every six months or annually, to monitor whether the RMI situation is getting better or worse. This is especially important if we have made any changes to reduce the risks of RMIs. (See Appendix A2)
4. Use checklists to help identify the features in jobs and workplaces that are potential risk factors for RMIs. (See Appendix A3 for a sample checklist). A checklist may not cover all the problems encountered, but will provide a basis for action. Customize existing checklists to meet the specific needs of different jobs and workplaces.

3. How to Control Ergonomic Hazards

The most important risk factors that contribute to ergonomic hazards such as MSI and RMI are:

- workstation design,
- working in a standing position
- work organization,
- tools, equipment, furniture design
- manual material handling
- work environment
- lighting and vision

Workstation Design

Workplace design includes:

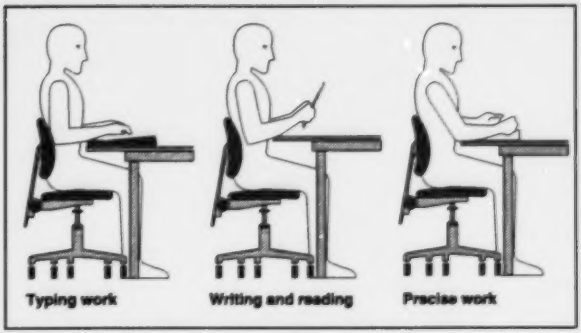
- work surface (desks)
- seats (chairs)
- accessories, and
- workstation layout

Work Surface

The work surface is the desk, table or bench we work at. If the work surface is too high or too low for our body size and the task we are doing, then we are required to perform tasks in awkward body positions.

The chair and/or work surface height should be adjusted properly to suit the individual and the type of work.

Awkward body position



For writing and reading the work surface should be about 5 cm above elbow height.

For typing and keyboarding, the work surface should be about the height of the elbows with the arms hanging straight by the sides.

If the work surface is not adjustable, then we should adjust the seat height so that the elbows are about the same height as the top of the work surface.

The thighs should be horizontal. If the feet are not resting flat on the floor, we should use a footrest.

MAKE adjustments so work surface is at the correct working height.

ENSURE that work surface is large enough to hold materials.

AVOID cramping legs under work surface.

DO NOT STORE materials under work surface.

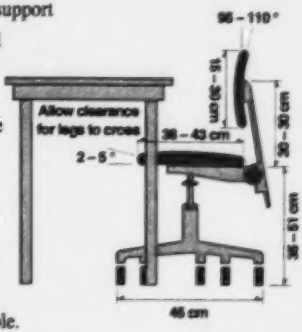
AVOID over-reaching and twisting.

STORE frequently used items in the most convenient places.

Seat (chair)

The seat should enable us to work without using awkward body positions or forceful movements. A good seat has the following qualities:

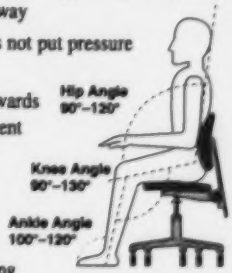
- provides back support
- can be adjusted
- allows us to get close to the work surface
- allows us to move easily



To encourage good body positions, the height of the seat and the slope of the back rest should be adjustable.

CHOOSE a chair with:

- adjustable height, seat, arm rest and back rest
- five castors for easy movement
- a backrest which is shaped to support the lower back and does not give way
- a seat height which does not put pressure on back of the thighs
- a seat that curves downwards at the front edge to prevent pressure on the back of legs
- a stable base
- a swivel mechanism so that we can avoid twisting



- arm rests which do not prevent the chair from being drawn up to the desk or interfere with natural movement
- non-slip breathable fabric on the seat

TIGHTEN the chair backrest so that it does not give way with body weight.

ADJUST the chair to suit your height and your workstation height.

To adjust a chair and work surface:

STAND in front of the chair. Adjust the height so the highest point of the seat is just below the knee cap.

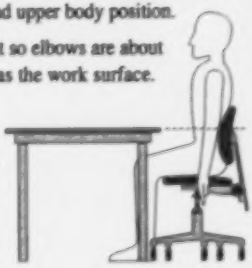
SIT so that the clearance between the front edge of the seat and the lower part of the legs just fits a clenched fist.

ADJUST the backrest of the chair so that it supports the hollow of the lower back.

ADJUST work surface to about the height of elbows with the arms hanging straight by the sides.

IF using a fixed height work surface, raise the chair or get the proper arm and upper body position.

ADJUST chair height so elbows are about the same height as the work surface.



USE a footrest if the feet cannot rest flat on the floor or if there is pressure on the back of the legs. The footrest should be adjustable and support the whole foot.

Alternative Chairs

The forward sloping chair and the kneeling chair are alternatives for workers who sit continuously.

Forward Sloping Chair

Includes a mechanism that tilts the seat pan forward 5° to 10°.

Advantages

- Increases the number of possible positions.
- Provides better alignment for spine
- Improves visual distance and angle to the task on work table
- Improves head position
- Decreases pressure on internal organs

Disadvantages

- May exaggerate lumbar curve of the spine
- Places more weight on legs and arms to control forward tilt of the upper body, and may result in earlier development of fatigue
- May cause clothing to ride up legs
- May cause the body to slide forward

Kneeling Chair

Includes fixed seat sloping at 30° forward and padded support for knees.

Advantages

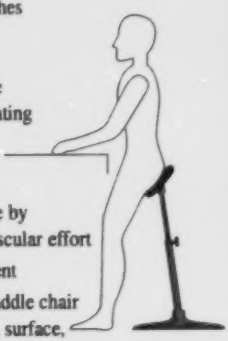
- Provides proper alignment for the spine
- May be good for some people if fitted to the individual
- Provides considerable comfort for short periods of time

Disadvantages

- Causes shins to bear weight
- Over-flexes knees and ankles
- Limits the number of possible sitting positions
- May cause fatigue to develop earlier
- May cause clothing to ride up legs
- Makes getting in and out of the chair difficult
- Reduces the range of reaches

Saddle Chair (Sit-stand seat)

A saddle chair is useful where the work can be performed by alternating between sitting and standing.



A saddle chair:

- reduces fatigue by decreasing muscular effort
- improves alignment

COMBINE the saddle chair with a tilted work surface, where possible, to:

- improve head position
- reduce stress on shoulders and neck

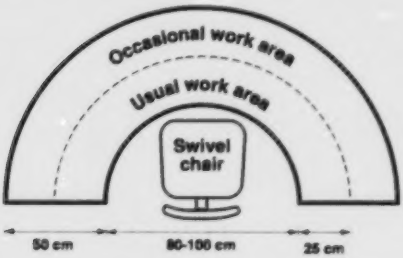
Accessories

Accessories include foot rests, foot rails, arm rests, and wrist rests. These accessories are intended to support our feet, legs, arms or wrists. For example, a foot rail or a portable foot rest would allow us to change body position and shift the weight of the body from one leg to the other, if we work in a standing position.

Poorly designed, improperly adjusted accessories may not provide support. As a result, we may use awkward body positions.

Workstation Layout

ARRANGE work in a semi-circle.



USE a swivel chair:

- to reduce body twisting
- to allow easy movements
- to reduce side-to-side motions

USE sloping work tables wherever possible:

- to reduce bending
- to encourage an upright position while sitting or standing.

Working in a Standing Position

Seats

Continuous standing or sitting while working is a common source of discomfort and fatigue.

Frequent changes of body positions, including sitting and standing, helps to avoid fatigue.

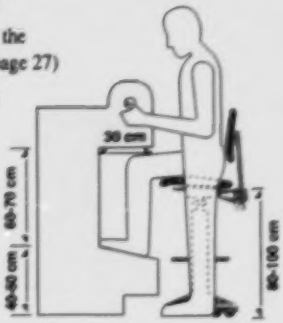
Workstand for Sit/Stand

ADJUST workstation to the proper height. (See page 27)

USE a swivel chair with an adjustable seat

ADJUST the chair seat height to 25-35 cm below the work surface

USE a footrest with a height of 40-50 cm.



Footwear

WEAR shoes that do not change the shape of your foot. Your feet can only be as comfortable as the footwear permits.

WEAR shoes that allow freedom to move your toes. Pain and fatigue result if shoes are too narrow or too shallow.

ENSURE shoes have arch supports. Lack of arch support causes flattening of the foot.

WEAR shoes with lace-up fastenings.

USE padding under the tongue if you suffer from tenderness over the bones at the top of the foot.

DO NOT WEAR completely flat (heel-less) shoes.

DO NOT WEAR shoes with heels higher than 5 cm (2 inches).

SELECT footwear taking into account individual fit and comfort. Try on and walk in before using.

Floors

KEEP work areas clean.

AVOID standing on concrete or metal floors. Recommended for standing work are wooden, cork or rubber covered floors.

ENSURE that the floors are level and non-slippery.

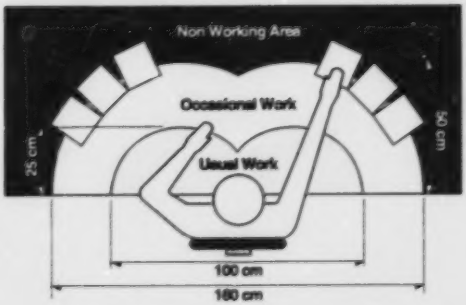
COVER concrete or metal floors with mats. Slanted edges on mats help prevent tripping.

DO NOT USE thick foam-rubber mats. Too much cushioning can cause fatigue and increase the hazard of tripping.

Work Organization

Work organization determines what jobs we do and how we do them. It gives us the flexibility to vary body positions and reduces the time we spend doing the same repetitive or forceful movements. Important components of good work organization are:

- work pace
- training and education
- rest breaks
- adjustment periods
- work breaks



Work station Layout

Improperly laid out work materials can create the risk factors for RMIs. A poor layout makes it hard for us to reach work objects without twisting, reaching or bending. One good way to arrange work materials is in a semi-circle shape.

Task Variety

There are at least three ways to vary tasks within a job:

- Job rotation—People move from one task to another according to a schedule.

- Job enlargement—More variety is added to the job.
- Team work—People form a team and each member of the team shares several different tasks.

Work Pace

Too fast a pace of work allows the body little recovery time between repetitive or forceful movements. This increases the risk of developing an RMI.

A good work pace should be determined by the joint efforts of management and workers. Such efforts can help to establish reasonable work quotas, schedules and goals that meet specific needs. Incentive systems that reward workers for the quality of work can also encourage a good work pace. On the other hand, incentives for the amount or quantity of work is likely to increase the risk of error, poor quality and RMI.

Work Breaks

Work breaks are the times when we stop working on one task and start another, allowing us to use different parts of the body. Work breaks can help prevent RMI by allowing us to rest, stretch or change body positions when we need to. For continuous VDT work, a work break of 5 to 15 minutes per hour is generally recommended.

Rest Breaks

Rest breaks are the times we stop working. Besides getting a refreshment, we should use this time to stretch and change body positions.

Adjustment Periods

An adjustment period is the time we need to get "in shape" when we return to our job after a long absence, or when we start a new job. It should allow us to build up muscle strength before we work at full capacity. The length of an adjustment period depends on the type of job.

Training and Education for Task Performance

Training and education are important for working safely and keeping well. Even the best work organization and workplace design cannot prevent RMIs if the training and education program is not adequate.

The contents of the office ergonomics training should include risk factors that can cause RMI and proper work practices to prevent RMI. Also, people must learn how to adjust chair, desk, monitor, keyboard, mouse and workstation in general to prevent RMI.

To be successful, the training program must be organized, consistent and ongoing. Everyone should be involved, including workers, managers, and health and safety representatives.

Tool, Equipment and Furniture Design

Ergonomic aspects must be taken into consideration when purchasing new tools, equipment and furniture or when moving to a new office location.

Consider the individual characteristics

The individual characteristics of the workers who will be using the tools, equipment and furniture makes a big difference. These characteristics include:

- Body size
- Height
- Gender
- Right-or left-handedness

Consider ergonomic aspects of use

Make sure that the use of new tools, equipment or furniture does not pose the risk of RMI. The user should be able to work:

- in a neutral body posture without excessive bending, reaching, twisting, and slouching;
- with wrist and hand in neutral position;
- without holding a single posture too long;

- without applying excessive force;
- without excessively repetitive movement same motions performed at a high frequency for several hours;
- without exposure to vibration; and
- without being exposed to unacceptable environmental conditions lighting, noise, heat, cold, and humidity.

Involve workers in the decision making process

Seek the opinion of workers in selecting tool, equipment and furniture. People tend to accept changes if they are involved in the decision making process. Of course, consulting a specialist is always a valuable investment in selecting proper tools, equipment or furniture.

Manual Material Handling

Many people in office environments need to move boxes and other heavy objects. Manual material handling involves lifting, lowering, pulling, pushing, carrying and holding materials. These activities pose risk of developing injuries, especially back injuries.

Guidelines for Manual Material Handling

REDUCE the weight of the load:

- Reduce the size by repacking
- Reduce the number of objects
- Assign more people to lift extra-heavy loads

MAKE the load easier to handle:

- Change the load's size and shape to move the centre of gravity nearer to the lifter
- Store the load at or above hip height but below shoulder height to avoid the need to bend, or reach above shoulders
- Use more than one person or a mechanical device to move the load
- Drag or roll the load with handling aids such as carts, rope, or slings

- Transfer the weight of the load to stronger parts of the body using handgrips, straps or belts

USE storage techniques to ease material handling:

- Store loads at waist level
- Use wall brackets, shelving or pallet stands of appropriate height
- Load pallets so that heavy articles are around the edges of the pallet and not in the centre

REDUCE the distance a load is carried:

- Improve the layout of the work area
- Relocate production or storage areas

REDUCE the number of lifts:

- Assign more people to the task
- Use mechanical aids
- Rearrange the storage or work area

REDUCE twisting of the body:

- Keep all loads in front of the body
- Allow enough space for the whole body to turn
- Turn by moving the feet rather than twisting the body
- Minimize bending to lift or shift a load

DO NOT TWIST while lifting, moving, pushing or pulling a load.

DO NOT BEND to the side during manual handling.

DO NOT SHIFT or raise a heavy load with outstretched arms.

DO NOT CARRY loads a long distance.

DO NOT SWING and throw heavy loads.

Guidelines for Lifting Boxes

Store boxes at waist height
DO NOT BEND over and try to lift box all at once
To Lift from the ground
1 Raise box upright
2 Put one knee against box
3 Pull box up the leg
4 Rest box on edge of knee of the other leg
5 Carry the load with your back in upright position
6 Stand upright

Guidelines for Transferring Boxes

1 Pull material towards you.
2 Transfer your weight to the lift side.
3 Lift only to level required.
4 Shift weight to your other leg
5 Push material into position

Work Environment

The work environment includes:

- Ventilation
- Noise
- Temperature and Humidity
- Lighting and Vision

Ventilation

The purpose of ventilation is to control the indoor temperature, humidity, odour, and airborne contaminants and to introduce outdoor air (fresh air).

There are two kinds of ventilation

1. Dilution ventilation
2. Local exhaust ventilation

Dilution ventilation – This type of ventilation reduces the indoor air contaminants by the dilution process. The used (contaminated) indoor air is exhausted at a preset rate replaced by taking in outdoor air at an equal rate. The ventilation system evenly distributes the air throughout the occupied space.

Dilution ventilation is used when:

- airborne contaminants are relatively non-toxic
- emission sources are widely distributed in an area
- dilution air is not contaminated

Local exhaust ventilation – the purpose of local ventilation is to exhaust the toxic gases, fumes, dusts and vapours near the point of emission to prevent mixing of these toxic emissions with the indoor air. Fume hoods are the most commonly used local exhaust ventilation.

Ventilation Standards

Acceptable ventilation standards are defined in the building code applicable to your workplace. The ASHRAE 62-1989 standard, by the American Society of Heating, Refrigeration and Air Conditioning Engineers, – is referenced in most building codes. This standard lists the required minimum rate of outdoor air intake for different types of workplaces. For offices, the required minimum rate of outdoor air intake is 20 cfm (cubic feet per minute) per person or 10 litres per second per person.

Office Noise Levels

The level of noise in an office depends on a number of factors: the nature of the work performed, the operation of equipment such as photocopiers, printers, typewriters and ventilation systems, the material used in floor and wall coverings, and the quantity and volume of telephone and conversational activity.

Industrial noise regulations are intended to prevent hearing loss and allow a sound level of 85 dB(A) for an 8-hour workday. Office noise is not loud enough to cause hearing loss. However, it can reduce concentration, cause stress and annoyance and interfere with communication.

There are guidelines for limiting office noise but there are no legal requirements.

The main objectives of the office noise guidelines are:

- to prevent interference with verbal communication
- to prevent annoyance and stress
- to minimize interference with concentration in the performance of mental work

At noise levels below 45 dB(A), very few people are disturbed. At levels around 55 dB(A) about half of the people feel some degree of disturbance. Intermittent noise and varying levels of noise are more annoying than continuous noise. Taking all these factors into account, it is generally recommended that noise levels in an office should be about 50 dB(A).

Masking Sound

Artificial constant background noise (known as white noise, masking sound or sound conditioning) is generally introduced in open plan offices. The purpose of masking sound is to conceal weak sounds from adjacent areas and provide privacy for verbal communication across an office desk. The level of such masking sound should not exceed 48 dB(A).

Guidelines for Noise Control

SELECT quiet equipment.

ENSURE that equipment is well maintained.

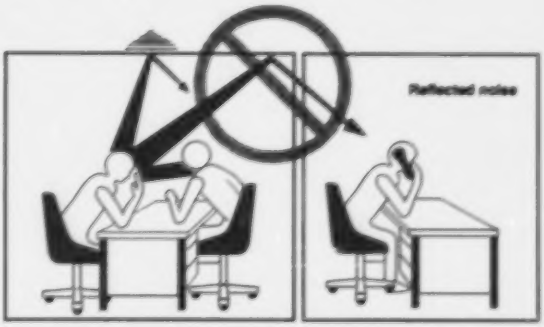
ISOLATE noisy equipment from general work areas.

USE sound-absorbing materials such as carpeting, curtains, acoustic baffles and typewriter pads.

CHOOSE and position acoustic screens carefully. The position of light fixtures, walls and desks can change noise levels.

USE conference rooms for conversations that could distract other workers.

SCHEDULE noisy tasks when they least affect others.



Temperature and Humidity

TEMPERATURE AND HUMIDITY together affect comfort.

OPTIMUM OFFICE TEMPERATURE is 20-24°C (70-75°F) [APWSS Red Book].

OPTIMUM OFFICE HUMIDITY is between 20 and 40% (APWSS Red Book) depending on outside temperature.

OFFICE VENTILATION systems are complex. Generally, building maintenance engineers maintain them. Report ventilation problems to the joint health and safety committee.

USE portable heaters only if the proper authority approves them. Heaters are potential fire hazards.

DO NOT USE heaters that can produce toxic fumes. (eg kerosene heaters)

USE only heaters with thermostats.

PLACE heaters or fans so that they do not blow air directly on workers.

KEEP heaters away from combustibles and curtains.

PLACE fans so that they do not vibrate and fall off surfaces.

UNPLUG heaters and fans and wait for blades to stop before moving them.

USE window curtains or blinds to increase or decrease heat from the sun.

CONSIDER impact on ventilation before rearranging office equipment or furniture.

WEAR clothing appropriate for the office conditions.

ENSURE that ventilation systems, dehumidifiers and humidifiers are properly cleaned and maintained.

Standard: American Society of Heating, Refrigeration and Air Conditioning Engineers, (ASHRAE) Standard 55-1992 is generally used to ensure adequate thermal environment.

Lighting and Vision

Lighting

Both intensity and quality of lighting (illumination) are important. Common lighting problems include too much light, too little light, glare and shadows. In order to see fine objects and read in poor lighting, people often use awkward body positions. Lighting should be evenly distributed throughout the workplace and should not create glare or shadows.

While office work is not known to cause permanent vision or eye problems, many office workers report eyestrain, a burning sensation in the eyes, blurred vision, eye irritation, dry eyes and headaches.

Contributing factors are:

- non-adjustable workstations where reading materials are too far away
- poor image quality on VDTs
- inadequate lighting, glare and shadows
- low humidity which causes the eyes to become dry, itchy and irritated
- uncorrected vision
- poor job design which results in long periods of close work

Preventing Vision Problems

Prevent vision problems by ensuring good conditions for viewing work tasks:

☑ POSITION work so that it is easy to see. Use adjustable chairs, well-positioned VDTs, adjustable work surfaces, and task lights.

USE legible source documents and VDTs with good image quality.

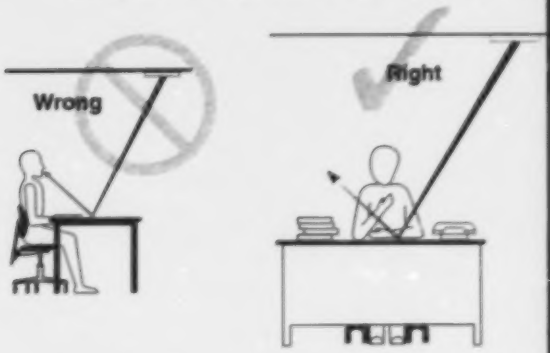
ENCOURAGE adequate humidity levels to prevent dry eyes.

ENSURE regular eye examinations to avoid problems of uncorrected or improperly corrected vision. People who work with video display terminals (VDT) may require a special prescription to be able to read at an intermediate distance that bifocals can not accommodate.

ENCOURAGE frequent changes in body position by varying tasks and using good work/rest schedules.

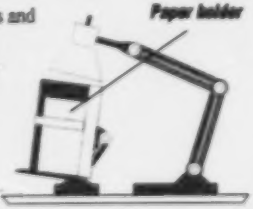
POSITION desk with window to the side of the worker.

POSITION desk so that ceiling lights are to the sides. Avoid placing desk where light fixtures are directly in front.



ADJUST window blinds or drapes to control light levels and glare.

USE low reflectance finishes and neutral colours on walls and furniture. The colour and finish of a surface determines how much light it reflects.



USE adjustable task lights to increase light levels when needed. Older workers need more light.

CHECK fluorescent lights for flicker. Replace fluorescent tubes regularly and maintain fixtures properly.

LOOK up and away from work frequently to rest the eyes.

WORK from good contrast, clear copy. Higher light levels are required for poor copy.

ENSURE that storerooms, corridors and stairways are well lit.

Appropriate light levels depend on visual preferences and type of work. In the following chart, the higher ranges are for workers with poorer vision and for work requiring high speed or accuracy.

Location	Light Level (LUX)
Corridors	50-150
Stairs	100-200
Coat Rooms	100-200
Stock Rooms	200-400
Traditional Office Tasks	500-750
Conference Rooms	300-750
Drawing Offices	500-1000

Check with the occupational health and safety agency or department in your jurisdiction for regulations regarding light levels.

DO NOT hang glossy pictures or objects in places where light will reflect into eyes.

DO NOT place a VDT facing a window.

✓ *VDT Workplace Checklist*

VDT workplaces must be flexible enough to accommodate the various individuals using them.

Use this checklist to identify problems in a VDT workplace.

"NO" answers indicate a potential problem and should be followed up. They may indicate the need for adjustment or changes in the workplace or job design.

VDT

- ☐ Top surface of the keyboard space bar (or bottom row of keys) is no higher than 6.5 cm (2.5 in.) above the work surface.
- ☐ During keyboard use, the forearm and upper arm form an angle of 80°-100°, with the upper arm almost vertical.
- ☐ The wrist is relaxed and not bent. Wrist rests are available.
- ☐ If used primarily for text entry, keyboard is directly in front of the operator.
- ☐ If used primarily for data entry, keyboard is directly in front of the keying hand.
- ☐ Keyboard is detached and moveable.
- ☐ Top of screen is about eye level with head up.
- ☐ Viewing distance is 30 to 60 cm (12 to 24 in.).
- ☐ Screen is free of glare or shadows.
- ☐ Images on the screen are sharp, easy to read and do not flicker.

Chair

- ☐ Chair has wheels or castors suitable for the floor surface.
- ☐ Chair swivels.
- ☐ Backrest is adjustable for both height and angle.
- ☐ Backrest supports the inward curve of the lower back.
- ☐ Chair height is appropriate for the individual and the work surface height.

- ☐ Chair is adjusted so that there is no pressure on the backs of the legs, and feet are flat on the floor or on a foot rest.
- ☐ Chair is adjustable from the sitting position.
- ☐ Chair upholstery is a breathable fabric.
- ☐ Footrests are used if feet do not rest flat on the floor.

Work Surface

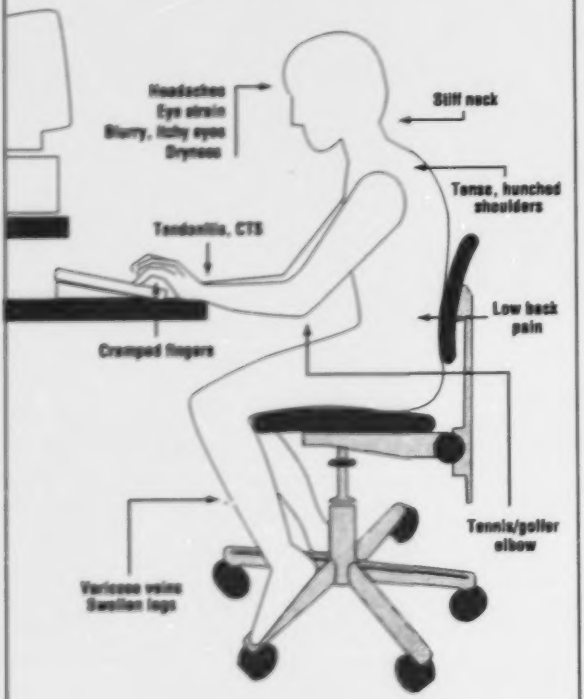
- ☐ Work surface height is adjustable.
- ☐ Leg room is sufficient to change position of legs without getting up.
- ☐ Work surface is large enough to hold work materials.
- ☐ Commonly used items are close to and in front of the operator.
- ☐ Infrequently used items are stored separately.

Visual Environment

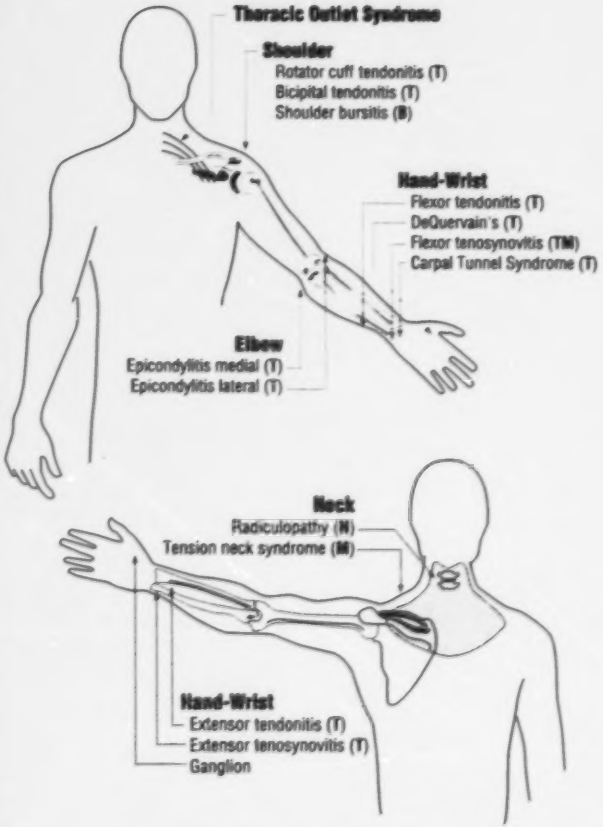
- ☐ Lighting does not produce direct glare or reflection on the screen.
- ☐ Lighting allows workers to easily read characters on the screen and source document.
- ☐ Wall colour is neutral and not too bright.
- ☐ Shiny surfaces and objects are covered or removed.
- ☐ Windows have blinds or curtains to prevent glare.
- ☐ VDTs are located away from windows, or screens are at a 90° angle to windows.
- ☐ Ceiling fluorescent lights are oriented lengthwise to the sides of the VDT.
- ☐ Room lighting is uniform and slightly dimmer than usual office lighting.
- ☐ General work areas have indirect or diffused lighting.
- ☐ Ceiling fluorescent lights are covered with diffusers or parabolic louvers.
- ☐ Adjustable task lights are available over source documents.

Common Health Hazards

This diagram illustrates an incorrect work posture, which can cause tiredness or overall deconditioning



RMI Related to Using Computers



T – Tendon/ligament M – Muscles
N – Nerves B – Bursa

Common Symptoms and Causes

Location	Cause
Neck pain	Monitor too high Chair too low Monitor or document holder too far off the line of vision Poor sitting posture Slumping and slouching Typing with winged-up shoulders
Shoulder pain	Tense shoulders while typing
Elbow pain	Desk is too high Operating the mouse located too far to the side
Carpal Tunnel Syndrome	Excessive up and down wrist and finger movement Typing with wrists bent upwards Tense or tight grip on a mouse
Low Back pain	Too long periods of sitting in one position Poor sitting position Slumping and slouching Chair is too high
Eyes **Eye strain** **Blurry, itchy eyes** **Dryness**	Reading materials too close or too far Too much or too little illumination Glare Improper location of reading materials Uncorrected vision Low humidity

VDT Workstation Adjustment

VDTs come with various features that are built in or that can be added. Use the adjustments provided.

ELIMINATE glare caused by lights, windows or bright objects.

ADJUST screen brightness and contrast. It is easier to read from the screen if characters are brighter than the background. Be careful not to make characters too bright.

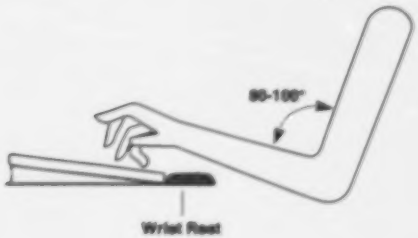
ADJUST the screen height so the top is just about eye level.

TILT the screen slightly backwards. Ensure that this does not create glare on the screen.

ADJUST chair, work surface and keyboard heights properly. (See page 30)

POSITION keyboard for two-handed "typing" directly in front of operator. Position keyboard for one-handed data entry in front of keying hand. Leave a large area free for source documents and other work materials.

MOVE the keyboard occasionally to change the arm and shoulder position.



USE an adjustable document holder. Place it next to the screen and at the same height. The head will have to turn less and eyes will adjust more easily. Refer to figure on next page (VDT Workplace).

ALTERNATE position of document holder on either side of VDT to vary head position.

CONNECT keyboard to VDT with a cord that is at least 70 cm (28 in.) long.

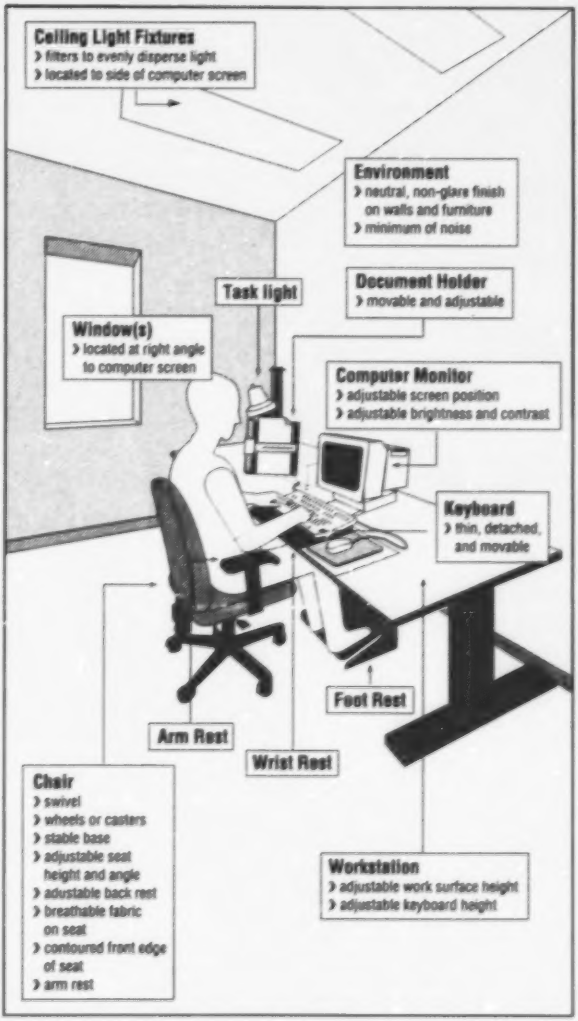
CHECK for excessive noise from the VDT or printer.

CLEAN the VDT screen regularly. Follow the manufacturer's instructions.

REPORT to your supervisor if you experience problems with VDT controls, flicker or excessive noise.

You and Your Workstation

Wrist in a neutral position (no bending)
Keyboard directly in front of you
Mouse close to the keyboard and at the same level
Shoulder and hip in line
Back rest fits inward curve of spine
Armrest at elbow height
Knees slightly lower than hip
Seat pan height–just below knee cap
Feet flat on floor or footrest


Ceiling Light Fixtures
› filters to evenly disperse light
› located to side of computer screen
Environment
› neutral, non-glare finish on walls and furniture
› minimum of noise
Task light
Document Holder
› movable and adjustable
Window(s)
› located at right angle to computer screen
Computer Monitor
› adjustable screen position
› adjustable brightness and contrast
Keyboard
› thin, detached, and movable
Foot Rest
Arm Rest
Wrist Rest
Chair
› swivel
› wheels or casters
› stable base
› adjustable seat height and angle
› adustable back rest
› breathable fabric on seat
› contoured front edge of seat
› arm rest
Workstation
› adjustable work surface height
› adjustable keyboard height

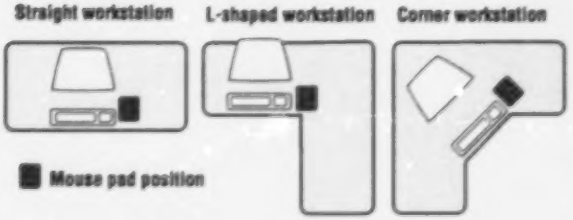
Using the Mouse

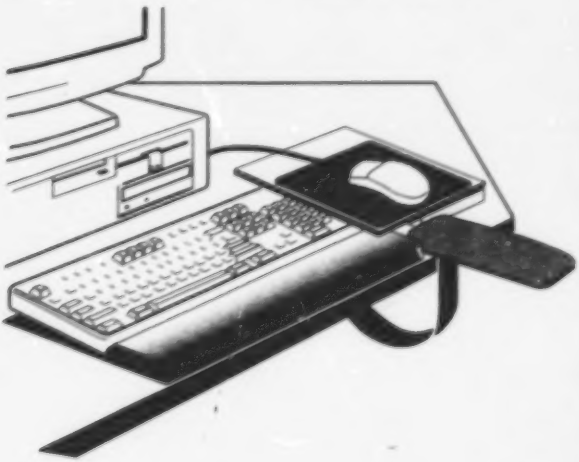
USING mouse for long periods causes discomfort and can lead to an injury.

SUITABLE layout of the workstation and proper work practices reduce the risk of injury.

☑ PLACE the mouse pad at the same level and as close to the side of the keyboard as feasible.

KEEP your hand at elbow level when using the mouse.





PLACE the mouse pad on a movable sleeve over numerical keys of the keyboard.

SUPPORT your arm on the arm rest or the desk.

GET adequate training on how to position and use the mouse.

MAINTAIN neutral body position and relaxed movements when using the mouse.

HOLD the mouse loosely with the palm and all fingers.

KEEP the wrist relaxed and straight. DO NOT LIFT your pinkie finger.

APPLY a light touch while clicking.

MOVE the mouse with your whole arm initiating the move from the shoulder.

DO NOT SQUEEZE the mouse, or press buttons with excessive force.

Using the Telephone while Operating a VDT

PLACE the telephone close to you on your right side if you are right-handed. It reduces repetitive reaching.

TALKING on the phone while typing or writing notes forces you to cradle the receiver between your shoulder and chin. This results in tension in the shoulder and neck causing discomfort and risk of musculoskeletal injury.

REPLACE the conventional telephone for the one equipped with a head set. In noisy areas consider the use of biaural headsets.

Correct Position

Incorrect Position

If you use your phone frequently, use a headset to reduce awkward neck postures

Radiation from VDTS

Video display terminals are potentially capable of emitting the following types of radiation:

- X-rays
- Electromagnetic radiation of very low frequency (VLF)
- Electromagnetic radiation of extremely low frequency (ELF)

X-rays

The picture tube (cathode ray tube, CRT) of the VDT produces low-energy x-rays. Such x-rays are almost completely absorbed in the glass housing of the picture tube. At the operator position, x-rays are not measurable. VDT operators do not need any kind of personal protective equipment (such as lead aprons) to protect themselves from x-ray exposure.

VLF Electromagnetic Radiation

VLF electromagnetic radiation is emitted by electronic components that produce images and letters on the VDT screen. The level of radiation at the operator's position is far below recommended exposure limits. In the past, there has been a concern regarding a possible link between VLF electromagnetic radiation exposure and adverse pregnancy outcomes. Recent studies did not confirm such a link.

ELF Electromagnetic Radiation

ELF electromagnetic radiation is emitted as a result of electric power use. All electrical appliances emit ELF electromagnetic radiation. Some researchers have found an increased risk of leukemia and brain cancer in people who live or work near electric power lines. There is no scientific evidence of health risks due to ELF electromagnetic radiation exposure among VDT operators.

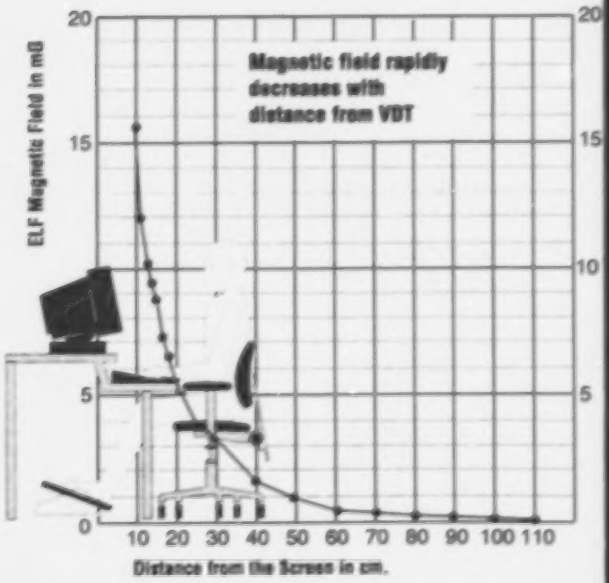
Exposure Limits

There are no Canadian or US exposure limits specific to VDT.

Protection: Prudent Avoidance

The scientific research results are not conclusive regarding possible links between electromagnetic radiation exposure and cancer. As a result, we are unable to determine safe exposure limits. In view of this uncertainty, we recommend prudent avoidance as a preventive measure which means to avoid all unnecessary exposures.

Electromagnetic fields decrease rapidly as the distance from VDT increases. Sitting as far back as comfortable and keeping distance from adjacent VDTS will reduce exposure.


ELF Magnetic Field in mG
20
15
5
0
Magnetic field rapidly decreases with distance from VDT
10 20 30 40 50 60 70 80 90 100 110
Distance from the Screen in cm.

Working with VDTs in a Standing Position

☑ ADJUST the height of the work surface to about the height of the elbow.

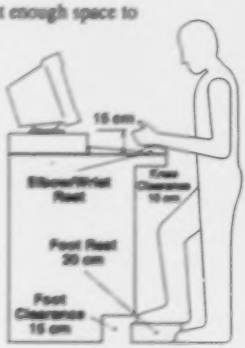
ORGANIZE your work so that the usual operations are within easy reach.

FACE the object that you work with at all times.

KEEP your body close to the work.

ADJUST the workplace to get enough space to change working position.

USE a footrail or portable footrest to shift body weight from both legs to one or the other.



USE a seat whenever possible:

- while performing your job, or
- at least occasionally when the work process allows for rest.

☒ DO NOT REACH behind the shoulder line. If necessary, shift feet to face the object.

DO NOT OVEREXTEND your reach beyond the point of comfort.

DO NOT REACH above shoulder height.

Documentation Holder

USE a A-frame document holder which has sufficient room for adjustment to raise, lower and angle the document to accommodate different screen heights.

VDT screen

Adjust VDT monitors above desk height to reduce postural strain to the neck muscles. The top of the VDT should generally be level with the user's horizontal eye level and at a distance of about one arm length when the operator is standing in his/her usual position for keying.

Chairs for Sit/Stand Workstation

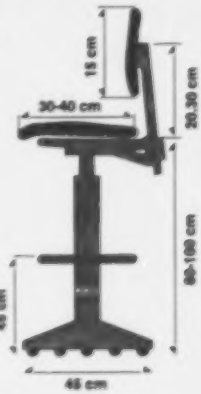
ENSURE that the seat has a minimum width of 40 cm.

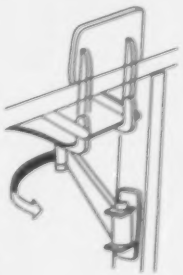
CHOOSE back rests that are contoured vertically and horizontally.

USE a seat covering made of non-slip, breathable fabric.

SELECT a seat padding about 2-3 cm thick

WHEREVER POSSIBLE, the workstation design should permit working in sitting or standing position at will.





See page 30 for "Saddle Chair"

VDT Workplace – Job Design

No matter how well designed a workplace is, health and safety problems arise if little attention is paid to how work is done. VDT work often involves repetitive movements of the hands and few changes in body position. This can lead to muscle pain and strain.

VARY work tasks. Break up VDT work by doing non-VDT tasks that place different demands on the body by changing body position.

WORK at a reasonable rate. Too fast a work pace contributes to muscle strain. Too slow a work pace contributes to boredom.

LOOK away from the screen occasionally and focus on a distant object to rest the eyes.

TAKE regular rest breaks to ease muscle aches, eye strain and stress.

USE rest breaks to stand up, move around and change mental activity.

RELAX muscles, stretch and change position. Exercises can be done at the VDT.

5. Office Safety

Most office accidents result from slips, trips, falls, lifting, being caught in or between objects, punctures or cuts.

Filing Cabinets

USE filing cabinets that allow one drawer to be open at a time.

PLACE cabinets so that drawers do not open into aisles.

CLOSE cabinet drawers when not in use.

DO NOT OPEN more than one drawer at a time.

LOAD cabinets starting from the bottom for stability.

SECURE cabinets to wall or floor.

USE handles to close drawers to avoid catching fingers.

AVOID overfilling cabinets to prevent paper and staple cuts.

DO NOT KEEP heavy objects on top of tall filing cabinets.

USE a proper ladder or step stool to reach high places. Do not use a box, desk or rolling chair.

Office Equipment

USE fingertip guards when handling paper.

STORE pencils and pens point down or flat in drawers.

SHEATH scissors, letter openers, razor blades or other sharp tools before storing.

USE paper cutter safely:

- Keep knife blade in locked position.
- Use proper guards.
- Maintain firm grip on blade handle.
- Do not cut too many papers at once.

USE a staple remover to remove staples.

FILE sharp edges off metal furniture.

Floors and Stairs

CLEAN up spills and tracked-in rain or snow.

PICK objects up off the floor. Even paper, pencils and rubber bands can cause trips and falls.

USE slip-resistant preparations on linoleum, tile, or other polished floor surfaces.

SECURE carpets and rugs.

USE handrails on stairs.

REMOVE stairway distractions (e.g. mirrors, posters).

WALK on the right.

DO NOT RUN, especially near corners.

INSTALL mirrors at blind, busy corners.

DO NOT STORE boxes, equipment or supplies outside doorways or in aisles.

DO NOT CARRY loads that obstruct vision.

DO NOT PARTICIPATE in horseplay.

Office Machines

KEEP long hair, fingers and jewellery away from moving machinery.

USE proper guards on machines.

OBSERVE directions and cautions when adjusting machinery.

CALL service for repairs.

DISCONNECT and report frayed electrical cords or plugs.

UNPLUG equipment when not in use or before making adjustments.

Fire Safety

USE nonflammable waste baskets.

STORE oily or solvent-soaked rags in fireproof containers.

DISPOSE of cigarette, cigar or pipe ashes properly.

KNOW evacuation procedures and the location of exits.

KNOW the location and classes of fire extinguishers and how to use them.

WEAR appropriate personal protective equipment and observe safety procedures when entering a plant or factory.

6. Exercises to Do in the Office

Exercises at the Desk

VDT work often involves repetitive movements of the hands and few changes in body position. This can lead to muscle pain and strain.

LOOK away from the screen occasionally and focus on a distant object to rest the eyes.

TAKE regular rest breaks to ease muscle aches, eye strain and stress.

USE rest breaks to stand up, move around and change mental activity.

RELAX muscles, stretch and change position.

EXERCISES can be done at the VDT workstation. Consult your doctor about exercise that is suitable for you.

Hand and Forearm Exercises

1. **Starting Position**

Step 1
Make a fist

Step 2
Touch your fingertips to the base of your palm, keeping the thumb straight.

Step 3
Gently make a hook. Don't force your fingers with your other hand if something is painful.

2. Gently bend wrist from side to side as far as possible. Hold 3-5 seconds. Repeat 3 times.

3. Start with arm in hand-shaking position and slowly rotate palm down until you feel a stretch. Hold 3-5 seconds. Then rotate palm up until you feel a stretch. Repeat 3 times.

4. Keeping elbow straight, grasp involved hand and slowly bend wrist down until you feel a stretch. Hold 3-5 seconds. Relax. Repeat 3 times.

5. With involved hand in a handshake position, grasp and slowly turn it to a palm down position until you feel a stretch. Hold 3-5 seconds. Relax. Repeat 3 times.

6. Sitting with elbows on table and palms together, slowly lower wrists to table until you feel a stretch. Be sure to keep palms together throughout the stretch. Hold 5-7 seconds. Relax. Repeat 3 times.

Neck and Shoulders

1. Shoulder Shrug

Purpose: To relieve early symptoms of tightness or tension in the shoulder and neck area.

Raise the top of your shoulders toward your ears until you feel slight tension in your neck and shoulders. Hold this feeling of tension for 3-5 seconds, then relax your shoulders downward into their normal position. Do this 2-3 times.

2. Head Glide

Purpose: To stretch chest, neck and shoulder muscles.

Sit or stand upright. Without lifting chin, glide head straight back. You know you're doing this exercise right if it gives you the feeling of a double chin. Hold for 20 counts and repeat 5-10 times.

3. Neck Relaxer

Purpose: To relax neck muscles.

Drop your head slowly to the left, trying to touch your left ear to your left shoulder. Repeat on the right side. Slowly drop your chin to your chest, turn your head all the way to the left, then turn all the way to the right.

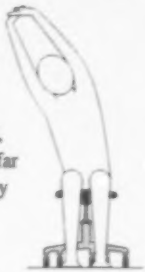
4. Shoulder Roll

Purpose: To relax shoulder muscles.

Slowly roll your shoulders backward five times in a circular motion. Then roll shoulders forward.

Back, Side and Legs

1. Back/Side Stretch



Purpose: To relax the back and side muscles.

Interlace fingers and lift arms overhead, keeping elbows straight. Press arms as far back as you can. To stretch sides, slowly lean to the left, then to the right.

2. Middle/Upper Back Stretch

Purpose: To stretch upper and middle back muscles

Hold your right arm with your left hand just above the elbow. Gently push your elbow toward your left shoulder. Hold stretch for 5 seconds. Repeat on left arm.

3. Back Curl

Purpose: To stretch lower back and legs.

Grasp shin. Lift leg off the floor. Bend forward (curling the back), reaching nose toward the knee.
Repeat with the other leg.

4. *Ankle Flex and Stretch*

Purpose: To stretch ankle muscles.

Hold one foot off the floor, leg straight. Alternately flex ankle (pointing toes up) and extend (pointing toes toward the floor). Repeat with the other leg.

5. *Leg Lift*

Purpose: Stretch leg muscles.

Sit forward on the chair so that your back is not touching the chair's back. Place feet flat on the floor. With a straight leg, lift one foot a few inches off the floor. Hold momentarily, return it to the floor. Repeat with the other leg.

7. Education and Training

Ergonomic education should be a part of the overall health and safety education specific to the workplace. Training should emphasize safe work practices and methods of adjusting workstations to prevent RMI.

A typical training session should include:

- An explanation of the ergonomic program
- The ergonomic hazards that cause MSI
- How to deal with RMI and back injuries
- How to report a suspected RMI case
- How to minimize the risk of RMI
- Actions taken by management to reduce occurrences of RMI
- The ergonomic aspects of VDT operation

Section III

Occupational Health and Safety Legislation

1. Canadian Occupational Health and Safety Legislation

Government's Responsibilities

Worker's Rights and Responsibilities

Supervisor's Responsibilities

Employer's Responsibilities

Formation of Joint Health and Safety Committee

Role of Joint Health and Safety Committee

Work Refusals

Workplace Hazardous Material Information System (WHMIS)

Hazard Symbols and Classes

2. US Occupational Health and Safety Legislation

General Outline

Duties of Employers

Duties of Employees

Key Provisions

Hazard Communication

Hazard Warning and Symbols

1. Canada

General Outline

The purpose of Occupational Health and Safety (OH&S) legislation is to protect you, the employee, against hazards on the job. It outlines the general rights and responsibilities of the employer, the supervisor and the employee.

The law makes both you and your employer jointly responsible for workplace health and safety legislation.

What does the OH&S legislation say?

Each of the provinces and the federal government have their own OH&S legislation. The details of the OH&S legislation vary slightly from one jurisdiction to another but the basic elements are the same.

Most Canadian jurisdictions have a *general duty provision* in their OH&S legislation which requires employers to take all reasonable precautions to protect the health and safety of employees.

1. Government's Responsibilities

- to enforce occupational health and safety legislation to conduct workplace inspections
- to disseminate information
- to promote training, education and research

2. Employee Rights and Responsibilities

Employee Rights:

- to refuse unsafe work
- to participate in workplace health and safety activities through the Joint Health and Safety Committee (JHSC) or an employee health and safety representative
- to know actual and potential dangers in the workplace

Employee Responsibilities:

- to work in compliance with the OH&S act and regulations
- to use personal protective equipment and clothing as directed by the employer
- to report workplace hazards and dangers

3. Supervisor's Responsibilities

- to ensure that employees use prescribed protective equipment
- to advise employees of potential and actual hazards
- to take every reasonable precaution in the circumstances for the protection of employees

4. Employer's Responsibilities

- to establish and maintain a joint health and safety committee, or cause employees to select at least one health and safety representative
- to take every reasonable precaution to ensure the workplace is safe
- to inform employees about any potential hazards and provide training to work safely
- to provide personal protective equipment and ensure workers know how to use the equipment safely and properly
- to immediately report all critical injuries to the government department responsible for OH&S
- to train all employees on how to safely use, handle, store and dispose of hazardous substances and handle emergencies

5. Joint Health and Safety Committee (JHSC)

- must be composed of management and employee representatives
- at least half the members of the committee must be employee representatives
- must meet at least once every 3 months; 1 month in some jurisdictions
- must be co-chaired by one management chairperson and one employee chairperson
- employee representatives are elected or selected by the employees or their union

6. Role of the Joint Health and Safety Committee

- to act as an advisory body
- to identify hazards and obtain information
- to recommend corrective actions
- to assist in resolving work refusal cases
- to participate in accident investigations and workplace inspections

7. Work Refusals

You can refuse work if you have reason to believe that the situation is unsafe to either yourself or your co-workers.

- You must report to your supervisor that you are refusing to work and state why you believe the situation is unsafe.
- You, your supervisor, and a JHSC member or employee representative will investigate.
- You return to work if the problem is resolved.
- If the problem is not resolved, a government health and safety representative is called.

- Your supervisor may assign you reasonable alternative work.
- The inspector will investigate the situation and give a decision.

Workplace Hazardous Materials Information System

WHMIS (Pronounced whimiss)

WHMIS applies to all Canadian workplaces. It requires that all workers who work with or near a hazardous substance (controlled product) be informed about its potential hazards and recommended safe work practices.

WHMIS requires that information be provided in three ways:

1. All controlled products used in the workplace must have a WHMIS label on the container.
2. Material Safety Data Sheets (MSDS) and hazard information must be readily available in the workplace. A MSDS summarizes the health and safety information about the product.
3. Workers must receive training to be able to recognize and work safely with chemicals.

The **HAZARD SYMBOL** is an important part of the WHMIS label. It warns the user that a particular hazard exists.

Actual hazards from toxic substances depend on the amount (level and duration) of exposure. A brief exposure at high levels may result in chemical poisoning within hours. Prolonged exposure at low levels may cause illness after several years.

Hazard Symbols and Classes

	Class A Compressed Gas	Contents under high pressure. Cylinder may explode or burst when heated, dropped or damaged.
	Class B Flammable and Combustible Material	May catch on fire when exposed to heat, spark or flame. May burst into flames.
	Class C Oxidizing Material	May cause fire or explosion when in contact with wood, fuels and other combustible material.
	Class D, Division 1 Poisonous and Infectious Material: immediate and serious toxic effects	Poisonous substance. A single exposure may be fatal or cause serious or permanent damage to health.
	Class D, Division 2 Poisonous and Infectious Material: other toxic effects	Poisonous substance. May cause irritation. Repeated exposure may cause cancer, birth defects, or other permanent damage.
	Class D, Division 3 Poisonous and Infectious Material: biohazardous infectious material	May cause disease or serious illness. Drastic exposures may result in death.
	Class E Corrosive Material	Can cause burns to eyes, skin or respiratory system.
	Class F Dangerously Reactive Material	May react violently causing explosion, fire or release of toxic gases, when exposed to light, heat, vibration or extreme temperatures.

2. US Occupational Health and Safety Legislation

General Outline

In the United States of America (USA) the Occupational Safety and Health Act is popularly known as OSHAct. The Occupational Safety and Health Administration (OSHA) is responsible for administering the OSHAct.

The OSHAct does not cover the following four categories of people:

- Self-employed persons
- Farms which employ only immediate family members of the farm employer
- Workers covered by other legislation
- State and local government employees

Regulations dealing with OSHA are published in Title 29 of the Code of Federal Regulations as:

- 29 CFR Part 1910—Occupational Safety and Health Standards
- 29 CFR Part 1926—Construction Standards

These standards define exposure limits, exposure monitoring methods, medical surveillance and protective measures.

Duties of Employers

The OSHAct sets out two main duties for employers:

- Employers must provide a workplace which is free from hazards that are known to cause or likely to cause death or serious physical harm to employees.
- Employers must comply with occupational safety and health standards under the Act.

Duties of Employees

Employees must comply with occupational safety and health standards, rules, regulations and orders which are applicable to their own conduct and actions.

Key Provisions

Some of the key provisions of the OSHAct are to:

- assure, insofar as possible, that every employee has safe and healthy working conditions.
- require employers to maintain accurate records of exposures to potentially toxic materials or harmful physical agents and inform employees of the monitoring results.
- provide for employee walk-around or interview of employees during the inspection process.
- provide procedures for investigating alleged violations, at the request of any employee or employee representatives, issuing citations and assessing monetary penalties against employers.

Hazard Communication

The intent of the OSHA Hazard Communication Standard is to provide employees with information and training about the potential health hazards from exposure to workplace chemicals. The Standard requires that employee training include:

- explanations of the requirements of the standard
- identification of workplace operations where hazardous chemicals are present
- knowledge of the methods and observations used to detect the presence of hazardous workplace chemicals
- assessment of the physical and health hazards of those chemicals
- warnings about hazards associated with chemicals in unlabelled pipes
- descriptions of hazards associated with non-routine tasks
- details about the measures employees can take to protect themselves against these hazards, including specific procedures

- explanation of the labelling system
- instructions on location and use of material safety data sheets (MSDSs)
- details on the availability and location of the hazardous materials inventory, MSDSs, and other written hazard communication material

Hazard Warning and Symbols

Chemicals produced in the USA come under OSHA Hazard Communication Standard. The label on the container must warn about potential hazards of the product. OSHA does not require hazard symbols on the label, however, the skull and crossbones symbol is acceptable on containers of highly toxic substances and the flame symbol is acceptable on containers of flammable substances.

Section IV

Information Sources

In Canada

Canadian Governmental Departments with Chief Responsibility for Occupational Health and Safety

In the US

US Federal Safety and Health Agencies

EPA

NIOSH

OSHA

OSHA Regional Offices

Ergonomic Standards and Guidelines

Canadian Governmental Departments with Chief Responsibility for Occupational Health and Safety

General

Canadian Centre for Occupational Health and Safety

Marketing, Sales and Communications
(905) 570-8094
Toll free in Canada and US: 1-800-668-4284
Fax: (905) 572-2206
E-mail: custserv@ccohs.ca
Web Site: www.ccohs.ca

Inquiries Service
(905) 572-4400
Toll-free: 1-800-263-8466
Fax: (905) 572-4500
E-mail: inquiries@ccohs.ca
OSH Answers Web Site: www.ccohs.ca/oshanswers

Federal Jurisdiction

Human Resources Development Canada

Labour Branch: (819) 953-0155
Workplace Information Directorate: 1-800-567-6866
Labour-Management Partnerships Program: 1-800-563-5677
E-mail: site.labour@hrdc-drhc.gc.ca
Web Site http://labour-travail.hrdc-drhc.gc.ca/eng

Alberta

Alberta Human Resources and Employment
Workplace Health and Safety
General Inquiries: (780) 427-8842
Fax: (780) 427-5698
Web Site: www.gov.ab.ca/lab/what/what3.html#whs

British Columbia

Workers' Compensation Board of British Columbia
General Inquiries: (604) 273-2266
Toll free in B.C.: 1-800-661-2112
Fax: (604) 279-3151
Web Site: www.worksafebc.com

Manitoba

Manitoba Labour Workplace Safety and Health Division
General Inquiries: (204) 945-3446
Toll free in Manitoba: 1-800-282-8069
Fax: (204) 945-4556
WHMIS: (204) 945-3603
Web Site: www.gov.mb.ca/labour/safety/index.html

New Brunswick

Workplace Health, Safety and Compensation Commission of New Brunswick
General Inquiries: (506) 632-2200
Toll free in N.B.: 1-800-442-9776
Fax: (506) 632-4999
E-mail: prevc tion@whscc.nb.ca
Web Site: www.whscc.nb.ca

Newfoundland

Workplace Health and Safety Compensation Commission
General Inquiries: (709) 778-1000
Toll-free in Newfoundland: 1-800-563-5471
Fax: (709) 738-1714
Web Site: www.whscc.nf.ca

Northwest Territories

Workers' Compensation Board of the Northwest Territories and Nunavut
General Inquiries: (867) 920-3888
Fax: (867) 873-4596
Toll-free in NWT: 1-800-661-0792

Nova Scotia

Department of Labour Occupational Health and Safety Division

General Inquiries: (902) 424-5400
Fax: (902) 424-3239
Toll free in Nova Scotia: 1-800-952-2687
Web Site: www.gov.ns.ca/labr/ohs/index2.htm
E-mail: labrohs@gov.ns.ca

Ontario

Ministry of Labour Occupational Health and Safety Branch

General Inquiries: (416) 326-7770
Toll free in Ontario: 1-800-268-8013
Fax: (416) 326-7761
Web Site: www.gov.on.ca/lab/ohs.htm
E-mail: weblab@gov.on.ca

Prince Edward Island

Workers' Compensation Board

14 Wexmouth Street
P.O. Box 757
Charlottetown C1A 7L7
General Inquiries: (902) 368-5680
Fax: (902) 368-5705
Web Site: www.wcb.pe.ca/

Québec

CSST (Commission de la santé et de la sécurité du travail du Québec)

General Inquiries: (514) 873-7183
Fax: (514) 873-7007
Service répertoire toxicologique
Phone: (514) 873-6374
Web Site: www.csst.qc.ca

F2

Saskatchewan

Saskatchewan Occupational Labour Health and Safety Division
General Inquiries: (306) 787-4496
Toll free in Saskatchewan: 1-800-567-7233
Web Site: www.labour.gov.sk.ca/safety/index.htm

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Workers' Compensation, Health and Safety Board
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Fax: (867) 393-6279
Toll free in the Yukon: 1-800-661-0443
Web Site: www.wcb.yk.ca

US Federal Safety and Health Agencies

EPA

401 M ST., SW
Washington, DC 20460 (202) 382-2080

NIOSH

National Institute for Occupational Safety and Health
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Cincinnati, OH 45226

Publications Dissemination
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Fax: (573) 533-8573
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Toll-free outside the US: 1-513-533-8471
Web Site: www.cdc.gov/NIOSH/homepage.html
E-mail: PubstaFt@cdc.gov

OSHA

Occupational Safety & Health Administration
200 Constitution Ave., NW
Washington, DC 20210
Phone: (202) 693-1999
Toll free: 1-800-321-OSHA
Web Site: www.osha.slc.gov

OSHA Regional Offices

Region 1: Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, and Vermont, US Dept. of Labor—OSHA
JFK Federal Building, Room E340
Boston, MA 02203
Phone: (617) 565-9860
Fax: (617) 565-9827
Web Site: www.osha.gov/oshdir/r01.html

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New York, NY 10014
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Fax: (212) 337-2371
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Fax: (404) 562-2295
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Chicago, IL 60604
Phone: (312) 353-2220
Fax: (312) 353-7774
Web Site: www.osha.gov/oshdir/r05.html

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1999 Broadway, Suite 1690
Denver, CO 80202-5716
General Inquiries: (303) 844-1600
Fax: (303) 844-1616
Web Site: www.osha.gov/oshdir/r08.html

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San Francisco, CA 94105
Phone: (415) 975-4310
Fax: (415) 975-4319
Web Site: www.osha.gov/oshdir/r09.html

Region 10: Alaska, Idaho, Oregon, and Washington
USA Dept. of Labor—OSHA
1111 Third Ave.
Suite 715
Seattle, WA 98101-3212
Phone: (206) 553-5930
Fax: (206) 553-6499
Web Site: www.osha.gov/oshdir/r10.html

Ergonomic Standards and Guidelines

1. California's Ergonomic Rule: General Industry Safety Orders, Section 5110, Ergonomics, Effective July 3, 1997.
2. U.S. Occupational Safety and Health Administration (OSHA): Proposed Ergonomic Rule, November, 1993
3. American National Standards Institute: Draft Standard, ANSI Z-365 1995.
4. Canadian Standards Association. CSA Z412-M89 Standard, 1989.
5. British Columbia Draft Ergonomic Regulations, 1994.
6. International Standardization Organization: ISO 9241 Standard, Ergonomic Requirements for Office Work with Visual Display Terminals, 1992 .
   - Part I General Introduction
   - Part II Guidelines on Task Requirements
   - Part III Visual Display Requirements
7. International Standardization Organization: ISO 6385 Standard, Ergonomic Principles of the Design of Work Systems, 1981.

Section III

Occupational Health and Safety Legislation

1. Canadian Occupational Health and Safety Legislation

Government's Responsibilities

Worker's Rights and Responsibilities

Supervisor's Responsibilities

Employer's Responsibilities

Formation of Joint Health and Safety Committee

Role of Joint Health and Safety Committee

Work Refusals

Workplace Hazardous Material Information System (WHMIS)

Hazard Symbols and Classes

2. US Occupational Health and Safety Legislation

General Outline

Duties of Employers

Duties of Employees

Key Provisions

Appendix A1

Sample Ergonomics Survey Questionnaire

(used by CCOHS)

Name *(Optional)*: _____

Introduction

The purpose of this survey is to analyze the ergonomic needs of staff based on existing health concerns and ergonomic standards. These needs will be carefully studied and prioritized by the Health and Safety Committee. Recommendations for remedial action will be made to Senior Management.

The entire questionnaire must be filled out carefully to ensure that proper consideration is given to those who require it. Please submit your survey to co-chairpersons of your joint health and safety committee. All individual surveys will be regarded as CONFIDENTIAL.

Background Information

1. What percentage of your time is spent:

   sitting _____

   standing _____

   walking _____

   operating a VDT _____

2. If you operate a VDT:

   a. How many years have you worked on a VDT? _____

   b. How many hours a day do you work on a VDT? _____

   c. How many days per week? _____

   d. Are there non-VDT tasks included in your job? _____

   e. Do you take your relief breaks (5 minutes each hour)? _____

3. Do you have a variety of tasks that take you away from your desk/workstation periodically?

☐ **Yes** ☐ **No**

4. What is your age? 15 - 19
20 - 29
30 - 39
40 - 49
50 - 59
60 +

5. Are you right-handed or left-handed, or both? *(check one)*

☐ Right ☐ Left ☐ Both

6. In the last year have you had pain or discomfort that has lasted two days or more in your:

Neck	☐ **Yes**	☐ **No**
Shoulder	☐ **Yes**	☐ **No**
Elbow	☐ **Yes**	☐ **No**
Wrist/forearm	☐ **Yes**	☐ **No**
Hand	☐ **Yes**	☐ **No**
Upper back	☐ **Yes**	☐ **No**
Lower back	☐ **Yes**	☐ **No**
Foot	☐ **Yes**	☐ **No**

7. Rate the pain or discomfort: *(please duplicate this page if more than one part of the body is involved)*

at work	☐ goes away	☐ stays same	☐ becomes worse
after work	☐ goes away	☐ stays same	☐ becomes worse
after a week away from work	☐ goes away	☐ stays same	☐ becomes worse

8. Altogether, how much does your pain or discomfort interfere with your work, your life outside work and your sleep? Please mark the scales with an "X".

For example	1	5 X	10
	None	Moderate	Very intense

How much does it interfere with your work?

1	5	10
No Interference		Had to take time off work

How much does it interfere with your life outside of work?

1	5	10
No Interference		Had to stop an activity outside of work

How much does it interfere with your sleep?

1	5	10
No Interference		It affects you every night

9. Can you relate the pain to any particular work task?

10. How do you feel after work?

1	5	10
Invigorated	Normal	Burned out exhausted

11. Has your doctor diagnosed any type of musculoskeletal injury? *For example:*

carpal tunnel syndrome ☐ **Yes** ☐ **No**

tendonitis ☐ **Yes** ☐ **No**

low back problem ☐ **Yes** ☐ **No**

☐ other musculoskeletal problem

Please describe: _____

_____

12. Do you think this injury is:

    a. caused by your work ☐ **Yes** ☐ **No**

    b. made worse by your work ☐ **Yes** ☐ **No**

13. Are you using any type of arm/wrist, splint or brace as treatment for the above injury? ☐ **Yes** ☐ **No**

14. Are you undergoing physical therapy for the above injury? Please explain.

_____

_____

_____

_____

_____

15. Do you have any of the following in your feet or legs when sitting at your desk/workstation?

Pain	☐ **Yes**	☐ **No**
Numbness	☐ **Yes**	☐ **No**
Tingling	☐ **Yes**	☐ **No**
Swelling	☐ **Yes**	☐ **No**

16. Do these symptoms continue after working hours?

    ☐ **Yes** ☐ **No**

17. Do you have varicose veins?

    ☐ **Yes** ☐ **No**

18. Do you have eye discomfort e.g., blurring, itchiness, redness, watering?

    ☐ **Yes** ☐ **No**

If YES, please describe:

_____

_____

_____

_____

_____

19. When were your eyes last checked? _____

_____

20. Do you wear eyeglasses?

☐ **Yes** ☐ **No**

21. Do you wear contact lenses?

☐ **Yes** ☐ **No**

22. If you operate a VDT, have you made your optometrist/opthamologist aware of this?

☐ **Yes** ☐ **No**

23. Do you get headaches?

☐ **Yes** ☐ **No**

If YES, how often _____

24. Please provide any other comments on how your work area affects your health.

_____

_____

_____

_____

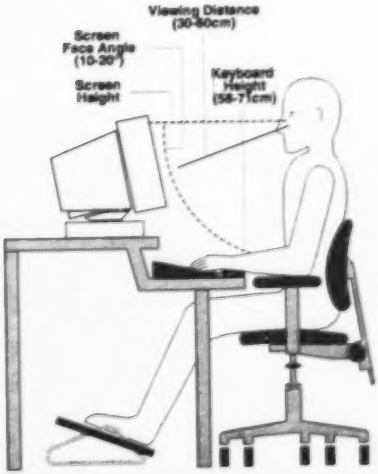
_____

Workstation Inventory

Please answer the following as they apply to you.

VDT

Do you have the following:	Yes	No	Don't Know
25. Shared workstation	___	___	___
26. Detached and moveable keyboard	___	___	___
27. Anti-glare filter/screen	___	___	___
28. Top of VDT screen at about eye level	___	___	___
29. Viewing distance between 30-60 cm	___	___	___
30. Sharp, easy to read images on VDT screen that do not flicker	___	___	___
31. Adjustable document holder	___	___	___



Chair

	Yes	No	Don't Know
32. Adjustable chair?	___	___	___
33. Chair that is easy to operate?	___	___	___
34. Comfortable back support?	___	___	___
35. Wheels/castors on your chair that work properly?	___	___	___
36. Footrest?	___	___	___
37. Armrests that do not block chair from getting close to work surface?	___	___	___
38. Feet resting flat on the floor while sitting with no pressure on back of legs?	___	___	___

39. How old is your chair? ___ Years

Work Area

40. Adjustable height work surface?	___	___	___
41. VDT placed on a standard desk?	___	___	___
42. Adequate space under work surface to allow changes in leg position without getting up?	___	___	___
43. Adequate work surface to hold your work materials?	___	___	___
44. Ability to move around freely without excessive bending, twisting or bumping into obstacles?	___	___	___

Visual Environment

	Yes	No	Don't Know
45. Enough light?	___	___	___
46 Too much light?	___	___	___
47. Shadows?	___	___	___
48. Adjustable task lamp?	___	___	___
49. Glare directly from overhead lighting?	___	___	___
50. Glare from your VDT screen?	___	___	___
51. Light reflecting back at you from any other shiny surface?	___	___	___

If YES, from where? _____

_____

52. Curtains or blinds on windows? ___ ___ ___

53. Special filter on ceiling lights? ___ ___ ___

54. Do you have any suggestions on how to improve your work area?

_____

_____

_____

_____

_____

Appendix A2

Sample Health Survey

1. What is your present job description?

   _____

   _____

   _____

2. How long have you been employed at your present job?

   _____

3. In the last year, have you had pain or discomfort that lasted 2 days or more?

Neck	☐ **Yes**	☐ **No**
Shoulder	☐ **Yes**	☐ **No**
Elbow	☐ **Yes**	☐ **No**
Wrist/forearm	☐ **Yes**	☐ **No**
Hand	☐ **Yes**	☐ **No**
Upper back	☐ **Yes**	☐ **No**
Lower back	☐ **Yes**	☐ **No**
Foot	☐ **Yes**	☐ **No**

If you answered "no" to these questions, stop here.

4. At work is the pain or discomfort ☐ better ☐ same ☐ worse

5. After your shift, is the pain or discomfort ☐ better ☐ same ☐ worse

6. After a week away from work, is the pain of discomfort ☐ better ☐ same ☐ worse

7. Did the pain or discomfort cause you to take time off work? ☐ **Yes** ☐ **No**

8. Altogether, how much does your pain or discomfort interfere with your work, your life outside of work, and your sleep? Please mark off on these scales with an "X".

For example	1	X 5	10
	None	Moderate	Very intense

How much does it interfere with your work?

1	5	10
No Interference		Had to take time off work

How much does it interfere with your life outside of work?

1	5	10
No Interference		Had to stop an activity outside of work

How much does it interfere with your sleep?

1	5	10
No Interference		It affects you every night

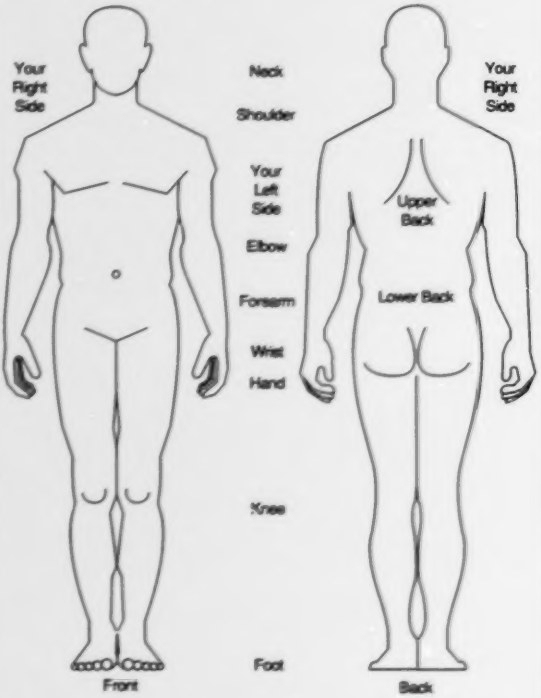
9. What is your sex? ☐ Male ☐ Female

10. How old are you? _____ years

11. Are you right-handed, left-handed, or both?

☐ Right-handed ☐ Left-handed ☐ Both

** Taken from a report prepared by CCOHS staff for the Government of Newfoundland*



12. In this diagram the body parts are shown approximately. This is a guide to help you tell us where your pain or discomfort is located (if any). Please shade in the areas that bother you.

13. Please make any comments or suggestion about how work affects you an how to correct any problems in the workplace.

Appendix A3

Sample Ergonomic Checklist

1. Work Organization

1.1	Does the person have a variety of tasks in a work day?	☐ Yes	☐ No
	If YES, does the person have some control over the order in which the tasks are done?	☐ Yes	☐ No
1.2	Does the person consider that the work rates are within his or her capacity?	☐ Yes	☐ No
	If NO, have they been reviewed recently?	☐ Yes	☐ No
1.3	Does the person have any control over the pace of work?	☐ Yes	☐ No
1.4	Are work cycles of a reasonable length so that work is not highly repetitious?	☐ Yes	☐ No
1.5	Is the workload reasonably constant?	☐ Yes	☐ No
1.6	Does the person work a standard working week?	☐ Yes	☐ No
1.7	Is pay based on a flat wage? (If bonus or incentive schemes are in operation, is the speed of production the sole criterion?)	☐ Yes	☐ No
1.8	Have work pauses been taken as appropriate?	☐ Yes	☐ No
1.9	If the person is a new staff member, or has returned recently from leave, did he or she have a period to adjust to the workload?	☐ Yes	☐ No
1.10	Does the person have any opportunity to participate in decision-making relevant to his or her work?	☐ Yes	☐ No

2. Workplace Design

Work Posture

2.1 Does the person have the choice to sit or stand at the work area? ☐ Yes ☐ No

2.2 Is there enough space to allow freedom of movement at the work area? (For example, when the person is seated, there should be enough space to move or stretch out legs.) ☐ Yes ☐ No

Standing

If the person is required to stand while working, the following questions are relevant:

2.3 Is a footrest available? ☐ Yes ☐ No

2.4 Is the floor surface appropriate? ☐ Yes ☐ No

2.5 Is a chair or stool provided? ☐ Yes ☐ No

Sitting

If the person is required to sit while working, the following questions are relevant:

2.6 Does the person find the seat comfortable? ☐ Yes ☐ No

2.7 Is it easy for the person to get into and out of the chair? ☐ Yes ☐ No

2.8 Does the seat height allow correct positioning of the legs? (The person's thighs should be parallel to the floor with the feet resting on the floor or on a footrest). ☐ Yes ☐ No

2.9 Does the backrest adequately support the lumbar area? ☐ Yes ☐ No

Work Level Height

2.10 If the task requires considerable strength and/or a wide range of arm movements, is the work level slightly below the elbows? ☐ **Yes** ☐ **No**

2.11 If the task requires precision, such as in the assembly of electronic equipment, is the work level slightly above the elbows? ☐ **Yes** ☐ **No**

Work Layout

2.12 Can most of the work be performed with the upper arms in relaxed position close to the body? ☐ **Yes** ☐ **No**

2.13 Are all frequently handled items within easy reach? ☐ **Yes** ☐ **No**

2.14 Is the work area designed to prevent undue bending and/or twisting of the neck or trunk? ☐ **Yes** ☐ **No**

2.15 Are displays easily read from the person's usual work position? ☐ **Yes** ☐ **No**

2.16 Are frequently used and important controls within easy reach? ☐ **Yes** ☐ **No**

2.17 Are controls easily grasped and operated? ☐ **Yes** ☐ **No**

Work Tools

2.18 Are the work tools appropriate for the tasks? ☐ **Yes** ☐ **No**

2.19 Do tool handles fit comfortably in the person's hands? (Consider shape, circumference, length, texture.) ☐ **Yes** ☐ **No**

2.20 During use, does each hand tool allow the person to keep his or her wrist in a neutral position? ☐ **Yes** ☐ **No**

2.21 Are the hand tools light-weight and balanced? ☐ Yes ☐ No

2.22 Are excessive grip strengths and grip spans avoided? ☐ Yes ☐ No

2.23 Is excessive vibration from hand-held power tools avoided? ☐ Yes ☐ No

2.24 Are balancers used to suspend power tools where appropriate? ☐ Yes ☐ No

2.25 Are work tools maintained in good condition? ☐ Yes ☐ No

Physical Work Environment

2.26 Does the person find the lighting satisfactory? ☐ Yes ☐ No

2.27 Does the person find the sound levels suitable for work? ☐ Yes ☐ No

2.28 Does the person find the temperature and airflow in the workplace comfortable? ☐ Yes ☐ No

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